



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: KISHORE C. ACHARYA ET AL.

FILED: JULY 31, 2002

SERIAL NO. 10/064,621

FOR: METHOD, SYSTEM AND COMPUTER PRODUCT FOR PLAQUE  
CHARACTERIZATION

#3/A  
10-8-02  
J. Astor

RECEIVED  
TECHNOLOGY CENTER 2800  
SEP 21 2002

PRELIMINARY AMENDMENT

BOX NO FEE AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Please enter the following amendment in the above-referenced application prior to examination:

**IN THE DETAILED DESCRIPTION:**

A "clean" version of paragraph [0028] as follows:

--In an exemplary embodiment, a composite image can be created by subtracting the non-contrast dataset from the contrast-enhanced dataset as shown in column 424 of FIG. 4. The resulting image can be used for viewing contrast enhanced anatomy. Subtracting the first set of image data 402 from the fourth set of image data 408 results in a seventh set of image data 414 that includes contrast enhanced anatomy only (calcified plaque removed). Subtracting the second set of image data 404 from the fifth set of image data 410 results in an eighth set of image data 416 that includes contrast enhanced anatomy only (calcified plaque removed). Subtracting the third set of image data 406 from the sixth set of image data 412 results in a ninth set of image data 418 that includes plaque characterization with the hard plaque and other non-contrast enhanced anatomy removed. Additional composite images obtained from both set of views (e.g., with the contrast agent and without the contrast agent) can be used to understand plaque characteristics. In an exemplary embodiment, the difference images 406 412 418 could be viewed on the display screen 40 once the scanning is complete. The processing device 32 can include instructions for creating and displaying the data in the matrix 400.--

A1

A "clean" version of paragraph [0029] as follows:

---

-- FIG. 5 is a block diagram of an exemplary method for post processing image data using an embodiment of the present invention. The process depicted in FIG. 5 can be used to localize and quantify soft tissue or non-calcified plaque using a contrast image. At step 502, vessel segmentation is performed. Vessel segmentation includes determining the location of the vessel of interest. Next, at step 504, vessel tracking is performed including following the flow of a contrast agent from the beginning of the vessel and plotting the diameter of the vessel to determine where the flow narrows and widens. Vessel tracking can be performed using a high x-ray energy level and a contrast agent as shown in box 410 of FIG. 4. An output from step 504 includes a curve reformat image 506. Next, at step 508, the volume of plaque is quantified by looking at the soft plaque absorption coefficient or HUs. An input to step 508 includes the curve reformat image 506. Quantifying the plaque and determining plaque characterizations can be performed using the difference between the lower x-ray energy level 304 and the higher x-ray energy level 302 as depicted in box 412 of FIG. 4. In this manner the structure of the plaque can be analyzed. Output from step 508 includes data describing the statistical make-up of the region of interest 510 (e.g., histogram plot of the HU numbers and contour plot). The data describing the statistical make-up of the region of interest 510 is input to step 512. Step 512 performs an identification, or localization, of the soft plaque. Output from this step includes a curve reformat image highlighting regions where the soft, or vulnerable, plaque is located 514. In an exemplary embodiment, the highlights are in color over the original curve reformat image 506.--

---